

REMARKS

By this amendment, applicants have amended claim 5 to recite that the core material comprises ceramic material. See, e.g., page 6, lines 25 - 27 of applicants' specification. Applicants have canceled claim 15 and added claims 16 - 20 to define further aspects of the present invention. Claims 16 - 20 are supported by, e.g., the description at page 3, lines 6 - 23 of applicants' specification.

In view of the cancellation of claim 15, reconsideration and withdrawal of the objection to the drawings under 37 CFR 1.83(a) in numbered section 2 of the office action are requested.

Claim 5 stands rejected under 35 USC 102(e) as being anticipated by United States Patent No. 5,860,401 to Adachi et al. Applicants traverse this rejection and request reconsideration thereof.

The present invention relates to a method for increasing the wear resistance of a work piece. See, page 1, lines 4 and 5 of appellants' specification. In order to increase the wear resistance of a work piece, it is known that the loaded surface of the work piece can be protected by means of a material that is of a greater hardness than the work piece material. Materials that cannot be reshaped, such as ceramic materials, called core materials in appellants' specification, are particularly suitable for this and are used as the core material according to the presently claimed invention. See, page 1, lines 7 - 13 of appellants' specification.

In accordance with the present invention, the core material is connected to the work piece in a form-fitting manner by means of a cold-extrusion or hot-extrusion of the work piece material. See, page 2, lines 7 - 10 of appellants' specification.

In order to achieve security against torsion, additional shaped elements such as, e.g., knurling, rounded-off notches and/or areas, hollow spaces and/or undercuts

are worked into the core materials are special surface qualities are produced. See, page 3, lines 31 - 36 of appellants' specification.

As shown in Figure 2a, for example, the additional shaped elements can comprise a knurling 3 as shown in Figure 2a. See, the paragraph bridging pages 6 and 7 of appellants' specification.

The patent to Adachi et al discloses a valve seat 46 formed from an insert ring, indicated generally by the reference numeral 67, which is bonded in place into the basic cylinder head material 42. The inserting and basic cylinder head material are both metals. A metallurgical bond is formed at the interface between the insert ring 67 and the base cylinder head material 42. See, e.g., column 6, lines 49 - 54 of Adachi et al. As can be seen in Figure 16 and the accompanying description, a solidus diffusion layer is formed by the bonding method.

Thus, while the Adachi et al patent describes a metallurgical bond (i.e., a pure substance fitting), the work piece is connected to the ceramic core material according to the present invention in a form-fitting manner by means of cold-extrusion or hot-extrusion of the work piece. Moreover, the shape of the core material is important to secure the core material against torsion in the work piece when cold extrusion or hot-extrusion is used to connect the work piece to the core material. The Adachi et al patent does not disclose a ceramic core material or a core material having the claimed shape, i.e., a core material having additional shaped elements provided on a peripheral surface of the core material for securing the core material against torsion in the work piece. Appellants submit the claimed shape for the core material would not be necessary when using the bond described in Adachi et al. Accordingly, it would not have been obvious to provide the core material in the claimed shape based on the teachings of Adachi et al.

The Examiner alleges that "Figure 7 [of Adachi et al] indicates that core material 67 has additional shaped elements which can be defined by two pair of angularly inclined portions near the areas of reference 67 and 89." However, the additional shaped elements of the present invention are provided on a peripheral surface of the core material for securing the core material against torsion in the work piece after connecting the work piece to the core material. On the other hand, Figure 7 of Adachi et al shows an intermediate phase of the bonding technique in which plastic deformation forms an extended extruded portion 89 which may contain surface impurities from the aluminum. In a later phase of the bonding, however, a finished machining process removes the impurities which may have been extruded at the area shown at 89 in Figure 7. See, e.g., Figure 10 and the description at column 8, lines 17 - 20 of Adachi et al. Thus, the portions noted by the Examiner do not secure the core material against torsion in the work piece after connecting the work piece to the core material as do the additional shaped elements of the present invention.

Accordingly, it is submitted the Adachi et al patent does not disclose several aspects of the present invention, i.e., a core material which comprises ceramic material or a core material which has additional shaped elements provided on a peripheral surface of the core material for securing the core material against torsion in the work piece after connecting the work piece to the core material, in combination with connecting the work piece to the core material in a form-fitting manner by means of cold-extrusion or hot-extrusion of the work piece material. Therefore, the Adachi et al patent does not anticipate the presently claimed invention.

Claims 5 and 6 stand rejected under 35 USC 103(a) as being unpatentable over Adachi et al in view of United States Patent No. 5,582,281 to Nakashima et al. Applicants traverse this rejection and request reconsideration thereof.

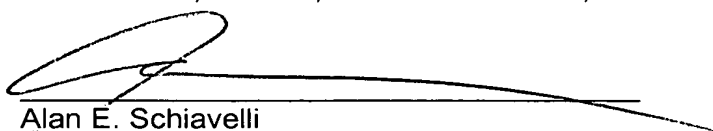
The patent to Nakashima et al relates to a method of connecting a sliding member to a synchronizer ring. While this patent discloses that the ring body 1 has a waveform-roughened surface 6 thereon at the portion 5 bonded to the sliding member and is further provided with notched portions 3 to improve the bonding strength between the body and the sliding member, both the ring body and sliding member of Nakashima et al are made of metal. Accordingly, the Nakashima et al patent, even in combination with Adachi et al, would not have suggested the presently claimed invention in which the core material comprises ceramic material. Accordingly, claim 6 is patentable over the proposed combination of Adachi et al and Nakashima et al.

In view of the foregoing amendments and remarks, favorable reconsideration and allowance of all of the claims now in the application are requested.

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (Case: 306.38372X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP



Alan E. Schiavelli
Registration No. 32,087

AES/jla
(703) 312-6600